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Research Paper

Navigating the Nexus: Exploring the Relationship between Intellectual Capital, Financial Performance, and Firm Value

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ABSTRACT

While previous study has drawn attention to the relationship between intellectual capital, financial performance, and firm value, there is still room for empirical research into the role of mediating factor between them. This research aims to determine the role of intellectual capital and financial performance in improving the firm value of the manufacturing companies listed on the Indonesia Stock Exchange. For this study, we collected financial reports from seven manufacturing companies over five years from 2017 to 2021. We employed a quantitative method, specifically path analysis using linear regression analysis, to test our hypotheses. The results demonstrate that there is no effect of intellectual capital on both financial performance and firm value, and no mediating effect exists either. However, the effect of company performance on firm value was established in the study. The research results create a chasm, suggesting three variables to think about when making investment decisions.

Introduction

Increased economic competitiveness driven by rapid advances in science and technology demands companies to have a competitive advantage to survive in free trade. Companies are required to swiftly shift their approach from being labor-based business to becoming knowledge-based businesses. Effective management of information and intellectual capital is crucial for the creative performance of firms in the twenty-first century, particularly for knowledge-intensive businesses (Mukaro et al., 2023). Different

experts have unanimously concluded that knowledge is the deciding element in this age of cutthroat competition (Weqar et al., 2020). Knowledge-based economies tend to create value based on intellectual capital and resources rather than tangible assets (Anwar & Siddiqui, 2020; Hejazi et al., 2016). It has a critical role in the long-term development of businesses (Albertini & Berger-Remy, 2019; Gupta et al., 2020; Li et al., 2019). Companies that effectively exploit their intellectual and knowledge assets are expected to create value and obtain competitive advantages through innovation, research, and development, thereby enhancing their financial performance (Ali et al., 2021; Li et al., 2019).

Intellectual capital, usually called "intangible asset" or "invisible asset" (Vaz et al., 2019) came to the fore when we are talking about intangible assets. The notion of intellectual capital has emerged as the modern focal point for economic progress, with the significance of tangible and financial assets diminishing in contrast to the impact of intangible assets (Gogan et al., 2016). Intellectual capital refers to the combined knowledge and intangible assets that organizations can employ to enhance their operational effectiveness (Vaz et al., 2019). It is a set of knowledge possessed by employees and firms that produces a competitive advantage in the form of an intellectual series such as knowledge, information, and intellectual property analysis, which they may utilize to create success through organizations (Weqar et al., 2020). It is an intangible asset that works with other assets to create value by translating them into other intangible resources or material resources to optimize the company's existing value from the perspective of its owners and stakeholders (Pirogova et al., 2020). Aside from improving financial outcomes, intellectual capital plays an essential role in strengthening a company's competitive position and achieving its goals.

The objective of the company is to maximize the value of the firm. Firm value, serving as the primary gauge of company achievement (Ni et al., 2021), represents an investor's assessment of the company's resource management prowess, evident in its stock price. A greater stock price corresponds to a higher firm value, while a reduced stock price signifies diminished firm value or company performance (Fajaria & Isnalita, 2018). Maximizing the value of the firm also equates to maximizing the prosperity of shareholders, which stands as the principal objective of the company (Bon & Hartoko, 2022). Initially, a firm value relied heavily on physical assets, with intangible assets being more speculative and less significant, but today, the importance of tangible assets has diminished, giving way to increased investments in intangibles like information (Albertini & Berger-Remy, 2019; Ali et al., 2022). Thus, more appreciation of the company's shares from investors is believed to be caused by the company's intellectual capital. Therefore, there is an increasing recognition of the role of intellectual capital that can push the market value of companies (Nuryaman, 2015).

Financial performance additionally reflects the fiscal well-being of a company. Financial performance is a picture of the financial condition of a company (Suhadak et al., 2018). By assessing the company's financial performance, an investor can see the condition or condition of a company. The financial well-being of the company is discernible through regular issuance of financial statements, offering a comprehensive snapshot of the company's fiscal standing (Gardi et al., 2023).

While previous study has drawn attention to the relationship between intellectual capital, financial performance, and firm value, there is still room for empirical research into the role of mediating factor. Exploration of the particular processes by which

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intellectual capital affects firm value through financial performance could fill a potential gap in the research of intellectual capital, financial performance, and firm value. Thus, the purpose of this study is to determine the role of intellectual capital and financial performance in increasing firm value.

Hypotheses Development

Ali et al. (2022), Weqar and Haque (2020), and Hejazi et al. (2016) found that intellectual capital has a positive and significant effect on financial performance. This demonstrates that higher levels of intellectual capital can increase financial performance (Acuña-Opazo et al., 2021). It contrasts with the findings of Weqar et al. (2020) who discovered no relation value between intellectual capital and financial performance in the case of productivity. Buallay et al. (2019) even found a negative effect between the two. Consequently, a hypothesis was formulated:
H1: *Intellectual capital has a significant positive effect on the company's financial performance.*

Hejazi et al. (2016) and Nguyen and Doan (2020) have proven that intellectual capital positively affects the company's financial performance as measured using VAIC™ formulated by Pulic (1998; 2020) for intellectual ability. Conversely, Hermanto et al. (2021) and Hamdan (2018) demonstrated that intellectual capital has no significant effect on firm value. As a result, a hypothesis was formulated:
H2: *Intellectual capital has a significant positive effect on firm value.*

The research conducted by Hermanto et al. (2021) proves that financial performance affects firm value. It demonstrates that the more intellectual capital can improve the company's financial performance, the higher the implication is an increase in the company's stock price. Hence, a hypothesis was formulated:
H3: *Financial performance has a significant positive effect on firm value.*

Considering different results yielded by previous studies, we suggest the existence of additional factors influencing this relationship. Therefore, this study adds an intervening variable namely financial performance in mediating the relationship of intellectual capital to firm value. A previous study has proven that financial performance mediates the effect of intellectual capital on firm value (Hermanto et al., 2021). Accordingly, a hypothesis was postulated:
H4: *Intellectual capital has a significant effect on firm value through financial performance.*

Method

Research Design

This study adopted a quantitative approach to investigate the hypotheses. The technique of path analysis was employed, and this was accomplished through the utilization of linear regression analysis.

Sample Selection and Data Sources

The focus of this study revolves around manufacturing companies listed on the Indonesia Stock Exchange (IDX) which published a full report from 2017 to 2021. The

sample criteria of this study encompass manufacturing industry companies that were consistently listed on the Stock Exchange throughout the research span, specifically from 2017 to 2021 (see Table 1). Additionally, the study requires access to complete financial report data, including quarterly financial statements, spanning the period from 2017 to 2021. Available numbers in financial statements are complete to be used and accounted for, and manufacturing enterprises that do not face consecutive losses from 2017 to 2021. The companies chosen are (Indonesia Stock Exchange):

Table 1. Study Samples

No	Description	Total
1	Manufacturing companies registered in Indonesia Stock Exchange in the periods of 2017-2021	144
2	Do not have quarterly financial statements for 2017-2021	89
3	Manufacturing companies that have negative profits in the periods of 2017-2021	35
4	Manufacturing companies whose annual reports do not use rupiah	13
	The Number of observation (7x5 years)	35

Instrumentation and Data Collection

In this study, non-participant observation serves as the data collection method, involving the study, observation, and documentation of pertinent materials (e.g., journal articles, theses and dissertation, relevant books) pertaining to the subject under examination. Subsequently, statistical software will be employed for data processing. The study employs secondary data encompassing financial reports for all variables: Intellectual capital (VACA, VAHU, STVA) as the independent variable, Return on Equity (ROE) as the intervening variable, and price-book value (PBV) as the dependent variable. These variables are extracted from the Indonesia Stock Exchange. Table 2 presents a summary of the proxies of the research variables.

Table 2. Proxies of the Research Variables

No	Variable	Proxy
1	Intellectual Capital	VA = Output – Input VACA = Value Added / Capital Employed VAHU = Value Added / Human Capital STVA = Structural Capital / Value added VAIC = VACA + VAHU + STVA
2	Firm Value	BV = Stock Equity / Number of shares outstanding

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No	Variable	Proxy
		PBV = Stock Price per Share / Number of shares outstanding
3	Financial Performance	ROE = Net Profit / Stockholder Equity

Results

I looked at how VAIC relates to ROE using regression analysis.

Table 3. VAIC on ROE

Variable	Unstandardized	Standardized	Std. Error	t-count	Sig.
X1	0.317	0.279	0.190	1.669	0.105
Constant	-0.031				
Fcount;Sig	2.784; 0.105				
Rsquare = 0.078; Adj. Rsquare = 0.050					
ROE=a+bVAIC +e					

Based on the results presented in Table 3, it can be explained as follows:

$e = \overline{1 - RRRRRRR}$

$e = \sqrt{1 - 0.078} = 0.960$

So that the regression model can be obtained as follows:
ROE= -0.031+ 0.317 VAIC+0.960

Furthermore, I assess how intellectual capital (VAIC) and financial performance (ROE) affect firm value (PBV).

Table 4. Regression of VAIC and ROE against PBV

Variable	Unstandardized	Standardized	Std. Error	t-count	Sig.
VAIC	0.121	0.003	1.931	0.062	0.951
ROE	29.710	0.954	1.701	17.467	0.000
Constant	-5.404				
Fcount;Sig	165.754; 0.000				
Rsquare = 0.912; Adj. Rsquare = 0.906					
ROE=a+bVAIC +e					

Based on the results in Table 4, it can be explained as follows:

$e = \overline{1 - RRRRRRR}$

$e = \sqrt{1 - 0{,}912} = 0{,}297$

So that the regression model can be obtained as follows:
PBV= -5.404 + 0.121VAIC + 29.710 ROE + 0.297

As demonstrated in Table 4, the subsequent analysis comprises a Sobel test, evaluating the indirect effect of institutional ownership on firm value through debt policy.

Prior information indicates that SX1 holds a value of 0.190, while Sz stands at 1.70.

$$z = \frac{aa}{a^2 SS_a{}^2 + a^2 SS_b{}^2}$$

where:
a= regression coefficient of the independent variable on mediation variable b= mediating variable regression coefficient on the dependent variable
SEa= standard error of estimation from the effect of independent variables on mediating variables
SEb= standard error of estimation from the effect of mediating variables on the dependent variable.

$$z = \frac{(0{,}279)x\ (0{,}954)}{(0{,}954)^2(0{,}190)^2 + (0{,}279)^2(1{,}701)^2} = 0{,}523$$

The Sobel test's significance was computed using the statistical calculator at https://www.danielsoper.com/statcalc/calculator.aspx?id=31, resulting in a significance value of 0.600, which exceeds the threshold of 0.05. Furthermore, the z-count value for the Sobel test is 0.523, indicating a z-value below 1.96. Consequently, with a 95% confidence level, it can be inferred that there is no significant indirect effect of VAIC on PBV through the ROE variable.

Table 5. Hypothesis Testing

Hypothesis	Statement	Sig. Value	Decision
1	Intellectual capital has a significant positive effect on the company's financial performance.	0.105	Rejected
2	Intellectual capital has a significant positive effect on firm value.	0.951	Rejected
3	Financial performance has a significant positive effect on firm value.	0.000	Accepted
4	Intellectual capital has a significant effect on firm value through financial performance.	0.600	Rejected

According to Table 5, the effect of intellectual capital (VAIC) on return on equity (ROE) has not been confirmed in this study. This is shown by the significance value of 0.105 so that the significance value is greater than 0.05, indicating that the effect is not significant at a 95% confidence level since the value is greater than 0.05. With regards to H2, this study revealed that the effect of intellectual capital (VAIC) on price-to-book value (PBV) has not been established. This is evidenced by the significance value of 0.951. The significance value surpasses 0.05. It can be deduced that there is no significant effect of

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VAIC on PBV at a 95% confidence level.

Moreover, the effect of return on equity (ROE) on price-to-book value (PBV) is proven. This is supported by the significance value of 0.000. With a significance value lower than 0.05, it can be concluded that there is a significant effect of ROE on PBV at a 95% confidence level. The regression coefficient value of 29.710 suggests a positive effect of ROE on PBV, implying that higher ROE leads to higher PBV. In addition, this study also depicted that the effect of intellectual capital (VAIC) on price-to-book value (PBV), through return on equity (ROE) has not been established. This is evidenced by the significance value of the Sobel test which is 0.600. exceeding the threshold of 0.05. Additionally, the z-count value of the Sobel test is 0.523, indicating a z-value below 1.96. Thus, it can be concluded that, with a 95% confidence level, there is no significant indirect effect of VAIC on PBV through the ROE variable.

Discussion

Mukaro et al. (2023) describe that by far, the most important aspect in improving organizational performance is intellectual capital. However, the effect of intellectual capital (VAIC) on company performance (ROE) is not established in this study. This finding diverges from the perspectives of Ali et al. (2022), Weqar and Haque (2020), and Hejazi et al. (2016), who contend that intellectual capital is believed to be able to play an important role in increasing the company's financial performance. Conversely, this study aligns with Weqar et al. (2020) by concluding that intellectual capital does not significantly affect company performance, and even supports Buallay et al. (2019), who identified a negative relationship between the two.

The effect of intellectual capital (VAIC) on firm value (PBV) has not been confirmed in this study. The results of this study oppose previous studies (Hejazi et al., 2016; Nguyen & Doan, 2020) suggesting that intellectual capital plays an important role in increasing firm value. However, in line with other studies (Hamdan, 2018; Hermanto et al., 2021), this research concurs, as their results also demonstrate an absence of significant effect between intellectual capital and firm value.

In this study, only financial performance variables that are proxied by return on equity (ROE) exhibit a significant effect on firm value. The increase in return on equity (ROE) can increase firm value. This finding provides valuable insight for decision-makers aiming to enhance firm value through the return on equity (ROE). A larger ratio value signifies more profit generated from equity, indicating heightened net income from owned capital. High ROE will make the position of the company's capital owners stronger. The study supports a previous study conducted by Hermanto et al. (2021) indicating that financial performance has a significant positive effect on firm value.

The effect of intellectual capital (VAIC) on price-to-book value (PBV), through return on equity (ROE) is not proven. This study stands in contrast to the findings of Hermanto et al. (2021), who established that financial performance mediates the effect of intellectual capital on firm value. We proffer that there are other factors that affect the relationship. Notably, the present study indicates that intellectual capital lacks a significant effect on both company performance and firm value, indicating that the direct and indirect effects through ROE are not significant.

In a knowledge-based economy, information and expertise hold greater significance than monetary resources and physical materials (Mukaro et al., 2023). Consequently, the

intellectual capital within an organization can yield additional advantages or assets, readily accessible through its workforce (Ali et al., 2021). Therefore, the research proposes that companies should prioritize intellectual capital by fostering employee learning and improvement, leading to increased profitability through expansion and valuable contributions (Ali et al., 2020). As long as a company masters the art of efficiently handling its intellectual capital, it can create value and maintain a competitive advantage (Mukaro et al., 2023).

Conclusion

The study yields several key conclusions. Firstly, it is evident that intellectual capital does not affect financial performance. The variable Return on Equity (ROE), employed as a measure of financial performance, remains unaffected by VAIC, the proxy of intellectual capital. Secondly, the investigation establishes that intellectual capital has no positive effect on firm value (as measured using PBV). The third conclusion is that high financial performance will increase firm value. This enhanced value becomes an attraction for potential investors in manufacturing firms. Lastly, the fourth conclusion underscores that there exists no significant effect of intellectual capital on firm value through company performance. Despite being mediated by financial performance, the VAIC does not impart any significant effect on the escalation of PBV. Despite the insightful results, this study has limitations: it focuses solely on Manufacturing Companies listed on the Indonesia Stock Exchange from 2017 to 2021, employs a limited set of variables (VAIC, ROE, PBV), and has a small sample size of seven companies. Future research should broaden the variables, and include diverse industries, and market growth for more robust insights.

Author' Declaration

The author made substantial contributions to the conception and design of the study. The author took responsibility for data analysis, interpretation and discussion of results. The author read and approved the final manuscript.

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